Claims:

1. A lens comprising:

a lens portion defining an anterior surface layer and a posterior surface layer;

an interior of the lens portion comprising an array of deformable cells each defining a volume of a selected fluid therein, each deformable cell in substantial engagement with either the anterior or posterior surface layer;

means for controllably causing fluid flow to alter the volume in at least a portion of the array of deformable cells to thereby controllably deform the anterior or posterior surface layer and alter optical parameters of the lens.

2. The lens of claim 1 wherein the array of deformable cells defines an axis that is substantially perpendicular to the anterior or posterior surface layer.

3. The lens of claim 1 wherein the array of deformable cells comprises hexagonal cells.

4. The lens of claim 1 wherein the array of deformable cells comprises round cells.

5. The lens of claim 1 wherein the means for controllably causing fluid flow to alter the volume in at least a portion of the array of deformable cells comprises a reservoir communicating with each cell via a channel, and a flow control mechanism for controlling movement of fluid between the deformable cell and the reservoir.

6. The lens of claim 1 wherein a single reservoir communicates with a subset of the array of deformable cells.

7. The lens of claim 5 wherein the flow control mechanism comprises a sacrificial plug.

8. The lens of claim 5 wherein the flow control mechanism comprises a valve operatively connected to each channel.

9. The lens of claim 8 wherein the valve is a photo-activated valve.

10. The lens of claim 5 wherein the reservoir is located within a periphery of the lens.

11. A power adjustable lens for vision correction, comprising:

a resilient lens body defining an anterior curvature and a posterior curvature;

an interior portion of the lens body including an array of deformable fluid-filled structures that engage a surface element of the lens body;

means for controllably causing a fluid to flow into or out of each fluid-filled structure to thereby controllably deform and alter an optical parameter of the lens.

12. The lens of claim 11 wherein the means for controllably causing a fluid to flow into or out of each fluid-filled structure comprises:

first and second reservoirs in communication with an interior chamber of each fluid-filled structure via respective first and second channels; and

a valve system coupled to said first and second channels for controlling fluid flows to the interior chamber of each fluid-filled structure.

13. The lens of claim 12 wherein the first reservoir defines a high internal fluid pressure relative to each fluid-filled structure and the second reservoir defines a low internal fluid pressure relative to each fluid-filled structure.

14. The lens of claim 12 wherein the valve system is normally closed and is openable by application of energy from an external source.

15. The lens of claim 12 wherein the valve system is photo-thermally actuated.

16. The lens of claim 12 wherein the valve system includes micro-actuator of a shape memory alloy.

17. The lens of claim 11 wherein the body of the fluid-filled structures and the fluid have matching indices of refraction.

18. The lens of claim 11 wherein the fluid-filled structures define a deformable engagement portion that engages a deformable surface element of the lens.

19. A method of adjusting the power of a lens used in vision correction, comprising:

providing a lens body with a plurality of deformable fluid-filled structures in an interior of the lens that engage a surface element of the lens body; and

controllably altering the volume of the fluid within selected fluid-filled structures thereby deforming the fluid-filled structure and the engaged surface element to thereby alter an optical parameter of the lens.

20. The method of claim 19 further comprising providing an index-matched fluid in a space in the lens body interior of the surface element and exterior of the deformable fluid-filled structures.

21. The method of claim 19 wherein controllably altering the volume of the fluid within selected fluid-filled structures includes actuating a valve system with light energy from an external source.

22. The method of claim 19 wherein controllably altering the volume of the fluid within selected fluid-filled structures comprises actuating at least one valve from a normally closed position to an open position with light energy from an external source.

23. The method according to claim 19 wherein controllably altering the volume of the fluid within selected fluid-filled structures comprises actuating at least one valve from a normally open position to a closed position with light energy from an external source.

24. The method of claim 19 wherein controllably altering the volume of the fluid within selected fluid-filled structures further comprises:

providing a wavefront sensing system; and

contemporaneously calculating optical parameters of the lens.

25. The method of claim 19 further comprising polymerizing the fluid to a substantially solid state to permanently fix the optical parameters of the lens.

26. A power adjustable lens for vision correction, comprising:

a lens body defining a resilient anterior surface element and a optical axis;

one or more resilient structures, each resilient structure having a fluid-filled interior chamber therein and extendable relative to optical axis between a first retracted position and a second extended position;

a reservoir; and

flow control means for causing flow of an index-matching fluid into or out of each resilient structure to deform the resilient anterior surface element and alter an optical parameter of the lens.

27. The lens of claim 26 wherein the resilient structures range in number between 1 and 500.

28. The lens of claim 26 wherein the resilient structures have a cross section ranging between about 20 microns and 5 mm.

29. The lens of claim 26 wherein the resilient structures define a dynamic range between the first retracted position and a second extended position between about 1 microns and 100 microns.